

Work Order ID 137436

September 30, 2015 3:22:57 PM

U/R

137436

Page 1

Item ID: D350-748-103

Revision ID: URF 15-561

Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015 Start Qty: 1.00

Required Date: 10/14/2015 Req'd Qty: 1.00

Reference:

Accept

N900040100

Setup Start *NS1*

Stop *NS2*

Cust Item ID:

Customer:

Approvals: Process Plan: SK Date: 20150930 Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start *NR1*

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D350-748-143	A U/R OK 9/15/10/11	0.00	DAS 0 9-30					MCS 1571-26	
100	Document Control	0.00						DAS 28 9-30	NOV 27 2014
100	DOCUMENT CONTROL								
DC	Memo	0.00							
Doc.Control -USB or Paperwork	Photocopy bluefile & type labels per PPPD350-748-103		CHG001						
110		0.00							
110	BENDING MACHINE - CROSSTUBES								
CNC Bend 1	Memo	0.00							
CNC Delta 100 Bender	Bend tube as per Dwg D350-748-143 using CNC bender program D350F and Folio FT _____								JW 15-11-12

****UNDER BEND .225" PER SIDE****

****USE (4) DT9824 SHIM BLOC TO CHECK STRAIGHTNESS****

D350-748-103/137436

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval 		
Description Work Order Deviation				Disposition					
								Completed By	
				Lead hand / Supervisor Approval Verification					
				QC / QA Coordinator Approval					

Root Cause				FAULT CATEGORY			
Environment ☐	☐	No Re-verification	☐	Pressure/Forced	☐	Temperature/Cure	☐
Design ☐	☐	Operator	☐	Bending	☐	Set-up	☐
Doc/Data ☐	☐	Offset/Setup	☐	Centre Not Concentric	☐	BOM/Route	☐
Equip/Tooling ☐	☐	Supplier	☐	Cracks	☐	Broken/Damage/Defect	☐
Handling/Pre ☐	☐	Training	☐	Crimp/Kink/Ripple/Wave	☐	Inspection Incomplete/Unqualified	☐
Material ☐	☐	Use for Testing	☐	Cuffs	☐	Contamination	☐
Internal Transport ☐	☐	Poor Information	☐	Crushing	☐	Countersink	☐
Tribal Knowledge ☐	☐	Rushing	☐	Heat Treat	☐	Cut Too Short	☐
LOA ☐	☐	Product Improvement	☐	Wave/Twist in Tube	☐	Instructions Incomplete/Unclear	☐
Substation ☐	☐	Process Improvement	☐	Marks/Chatter	☐	Drill Holes	☐
Past Expiry Date ☐	☐	Manufacturing Process	☐	OTHER : _____ _____ _____			
Misidentified ☐	☐	Past Due	☐				

Work Order ID 137436

137436

Page 2

September 30, 2015 3:22:57 PM

Item ID: D350-748-103 Accept *N9000040100* Setup Start *NS1*
 Revision ID: URF 15-561 Stop *NS2*
 Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube
 Start Date: 9/30/2015 Start Qty: 1.00 *1* Cust Item ID:
 Required Date: 10/14/2015 Req'd Qty: 1.00 *1* Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start *NR1*
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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120

0.00

120

Crosstubes

Crosstubes

Memo

VERIFY CROSSTUBE DIMENSIONS AS PER DWG

9 15-11-20
9-89

0.00

127

QC15- Crosstube Dimensional Check

0.00

127

QC

Quality Control

Memo

MARK CUT LINES

0.00

1 15/11/16
DAS
49
9-89

128

0.00

128

Crosstubes

Crosstubes

Memo

CUT TUBE AT HEIGHT ON FAI SHEET

VERF HEIGHT 23.25 BY QC 15 LEVEL INSPECTOR

VERF TWIST 1045 BY QC15 LEVEL INSPECTOR

BC 15/11/16

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					
Root Cause		FAULT CATEGORY							
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐				
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐				
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐				
Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐				
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐				
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐				
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐				
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐				
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐				
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐				
Past Expiry Date ☐	Manufacturing Process ☐	OTHER : _____							
Misidentified ☐	Past Due ☐								

Work Order ID 137436***137436***

Page 3

Item ID: D350-748-103

Accept

N900040100Setup Start ***NS1***

Revision ID: URF 15-561

Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Stop ***NS2***

Start Date: 9/30/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/14/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***
Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Crosstubes	0.00							
130									
Crosstubes	Memo	0.00							
Crosstubes									
	2- Drill Tube as per Dwg D350-748-143 Using DT8876 A,B & C Drill Jigs, Set-up drill table as per QSI 010								
	3- Deburr								
	4- Engrave Part # and Batch # as per Dwg D350-748-143								
	5- Remove all marks from tube within limits of D350-748-143								
	6- Apply a light coat of LPS3 on the interior of tube Batch: _____								
140	QC5- Inspect part completeness to step on W/O	0.00							
140									
QC	Memo	0.00							
Quality Control	CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)								

PL 15/11/18

TW 15-11-18

① 15-11-20 DAS
9
9-89

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					

Root Cause				FAULT CATEGORY							
Environment	☐	No Re-verification	☐	Pressure/Forced	☐	Temperature/Cure	☐	Power Loss/Surge	☐	Positioned Wrong	☐
Design	☐	Operator	☐	Bending	☐	Set-up	☐	Folio/Program	☐	Outside Dimensions	☐
Doc/Data	☐	Offset/Setup	☐	Centre Not Concentric	☐	BOM/Route	☐	Grain	☐	Over/Under tolerance	☐
Equip/Tooling	☐	Supplier	☐	Cracks	☐	Broken/Damage/Defect	☐	Weld	☐	Part Incorrect	☐
Handling/Pre	☐	Training	☐	Crimp/Kink/Ripple/Wave	☐	Inspection Incomplete/Unqualified	☐	Wrong Stock Pulled	☐	Part Lost/Missing	☐
Material	☐	Use for Testing	☐	Cuffs	☐	Contamination	☐	Out of Sequence	☐	Part Moved	☐
Internal Transport	☐	Poor Information	☐	Crushing	☐	Countersink	☐	Off-set	☐	Drawing	☐
Tribal Knowledge	☐	Rushing	☐	Heat Treat	☐	Cut Too Short	☐	Mislabeled	☐	Finish	☐
LOA	☐	Product Improvement	☐	Wave/Twist in Tube	☐	Instructions Incomplete/Unclear	☐	Fit/Function	☐	Misread	☐
Substation	☐	Process Improvement	☐	Marks/Chatter	☐	Drill Holes	☐	Misaligned/off center	☐	Turning Sequence	☐
Past Expiry Date	☐	Manufacturing Process	☐	OTHER : _____							
Misidentified	☐	Past Due	☐								

Work Order ID 137436

September 30, 2015 3:22:57 PM

137436

Page 4

Item ID: D350-748-103

Accept

N900040100

Setup Start

NS1

Revision ID: URF 15-561

Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Stop

NS2

Start Date: 9/30/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/14/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run Start

NR1

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop

NR2Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

174

Outsource process - NDT per QSI038 4.1

0.00

174

Outsource2

Memo

0.00

Outsource process - NDT

ISSUE P/O TO ACUREN: 30533

CL NOV 23 2015

1

176

Receive & Inspect for Damage & Mat'l Certs

0.00

176

Packaging

Memo

0.00

Packaging

IX 80154123

178

QC5- Inspect part completeness to step on W/O

0.00

178

QC

Memo

0.00

Quality Control

1

DAS
38
9-89

NOV 27 2015

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS <table style="width:100%; border: none;"> <tr> <td style="width:15%;">Skid-tube ☐</td> <td style="width:15%;">Cross tube ☐</td> <td style="width:15%;">Water Jet ☐</td> <td style="width:15%;">Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>						Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐																						
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Date :		Step #:		QTY Effective :		MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval																			
Description Work Order Deviation				Disposition																					

Root Cause				FAULT CATEGORY			
Environment ☐	Design ☐	Doc/Data ☐	Equip/Tooling ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐
Handling/Pre ☐	Material ☐	Internal Transport ☐	Tribal Knowledge ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐
LOA ☐	Substation ☐	Past Expiry Date ☐	Misidentified ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐
				Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐
				Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐
				Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐
				Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐
				Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐
				Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐
				Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐
				OTHER : _____			

Work Order ID 137436***137436***

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Item ID: D350-748-103

Accept

N900040100

Setup Start

NS1

Revision ID: URF 15-561

Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Stop

NS2

Start Date: 9/30/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/14/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

NR1

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	SprayPaint	0.00				1			DAS 41 9-89
180 SprayPaint Spray Painting.	☆ over Memo 1-Prime inside and out crosstube as per QSI 005 4.2 BATCH: <u>133084</u> 2-Paint Outside of Tube as per Dart QSI 005 4.2 BATCH: <u>133325</u>	0.00							15-11-23
190	QC14- Inspect Spray Paint	0.00				/			DAS 38 9-89
190 QC Quality Control	Memo Then, Wrap in plastic bag to protect from scratches	0.00							NOV 27 2015

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed

Date: 16/02/15Work Order update only ☐

Work Order: <u>137436</u> Part No. <u>D350-748-103</u> NCR No. <u>16-5566</u>		DISPOSITION Rework ☒ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS <table style="width:100%;"> <tr> <td>Skid-tube ☐</td> <td>Cross tube ☒</td> <td>Water Jet ☐</td> <td>Engineering ☒</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>				Skid-tube ☐	Cross tube ☒	Water Jet ☐	Engineering ☒	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐																																																	
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Large Fab ☐	Composite ☐	Supplier ☐																																																																					
Date: <u>15/10/1</u>		Step #: <u>180</u>		QTY Effective: <u>1</u>		MRB (QSI042) Approval DAS 12 9-89 15/10/1																																																																	
Description Work Order Deviation				Disposition																																																																			
Prep surface per QSI 005 4.1.4				Axalta 132058 B/N: 130500 Axalta Metabak Z305 B/N: 132474				Completed By DAS 41 9-89 15-11-23																																																															
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								DEC 03 2015																																																															
Root Cause <table style="width:100%;"> <tr><td>Environment ☐</td><td>No Re-verification ☐</td></tr> <tr><td>Design ☐</td><td>Operator ☐</td></tr> <tr><td>Doc/Data ☐</td><td>Offset/Setup ☐</td></tr> <tr><td>Equip/Tooling ☐</td><td>Supplier ☐</td></tr> <tr><td>Handling/Pre ☐</td><td>Training ☐</td></tr> <tr><td>Material ☐</td><td>Use for Testing ☐</td></tr> <tr><td>Internal Transport ☐</td><td>Poor Information ☐</td></tr> <tr><td>Tribal Knowledge ☐</td><td>Rushing ☐</td></tr> <tr><td>LOA ☐</td><td>☒ Product Improvement</td></tr> <tr><td>Substation ☐</td><td>Process Improvement ☐</td></tr> <tr><td>Past Expiry Date ☐</td><td>Manufacturing Process ☐</td></tr> <tr><td>Misidentified ☐</td><td>Past Due ☐</td></tr> </table>				Environment ☐	No Re-verification ☐	Design ☐	Operator ☐	Doc/Data ☐	Offset/Setup ☐	Equip/Tooling ☐	Supplier ☐	Handling/Pre ☐	Training ☐	Material ☐	Use for Testing ☐	Internal Transport ☐	Poor Information ☐	Tribal Knowledge ☐	Rushing ☐	LOA ☐	☒ Product Improvement	Substation ☐	Process Improvement ☐	Past Expiry Date ☐	Manufacturing Process ☐	Misidentified ☐	Past Due ☐	FAULT CATEGORY <table style="width:100%;"> <tr><td>Pressure/Forced ☐</td><td>Temperature/Cure ☐</td><td>Power Loss/Surge ☐</td><td>Positioned Wrong ☐</td></tr> <tr><td>Bending ☐</td><td>Set-up ☐</td><td>Folio/Program ☐</td><td>Outside Dimensions ☐</td></tr> <tr><td>Centre Not Concentric ☐</td><td>BOM/Route ☐</td><td>Grain ☐</td><td>Over/Under tolerance ☐</td></tr> <tr><td>Cracks ☐</td><td>Broken/Damage/Defect ☐</td><td>Weld ☐</td><td>Part Incorrect ☐</td></tr> <tr><td>Crimp/Kink/Ripple/Wave ☐</td><td>Inspection Incomplete/Unqualified ☐</td><td>Wrong Stock Pulled ☐</td><td>Part Lost/Missing ☐</td></tr> <tr><td>Cuffs ☐</td><td>Contamination ☐</td><td>Out of Sequence ☐</td><td>Part Moved ☐</td></tr> <tr><td>Crushing ☐</td><td>Countersink ☐</td><td>Off-set ☐</td><td>☒ Drawing</td></tr> <tr><td>Heat Treat ☐</td><td>Cut Too Short ☐</td><td>Mislabeled ☐</td><td>Finish ☐</td></tr> <tr><td>Wave/Twist in Tube ☐</td><td>Instructions Incomplete/Unclear ☐</td><td>☒ Fit/Function</td><td>Misread ☐</td></tr> <tr><td>Marks/Chatter ☐</td><td>Drill Holes ☐</td><td>Misaligned/off center ☐</td><td>Turning Sequence ☐</td></tr> </table>				Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐	Crushing ☐	Countersink ☐	Off-set ☐	☒ Drawing	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	☒ Fit/Function	Misread ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐
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Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐																																																																				
Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐																																																																				
Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐																																																																				
Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐																																																																				
Crushing ☐	Countersink ☐	Off-set ☐	☒ Drawing																																																																				
Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐																																																																				
Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	☒ Fit/Function	Misread ☐																																																																				
Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐																																																																				
OTHER: _____																																																																							

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					

Root Cause				FAULT CATEGORY			
Environment ☐	Design ☐	Doc/Data ☐	Equip/Tooling ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐
Handling/Pre ☐	Material ☐	Internal Transport ☐	Tribal Knowledge ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐
LOA ☐	Substation ☐	Past Expiry Date ☐	Misidentified ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐
				Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐
				Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐
				Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐
				Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐
				Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐
				Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐
				Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐
				OTHER : _____			

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval		
Description Work Order Deviation				Disposition					
								Completed By	
								Lead hand / Supervisor Approval Verification	
								QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY							
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐				
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐				
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐				
Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐				
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐				
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐				
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐				
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐				
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐				
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐				
Past Expiry Date ☐	Manufacturing Process ☐	OTHER :							
Misidentified ☐	Past Due ☐								

Work Order ID 137436***137436***

Page 8

Item ID: D350-748-103

Accept

N900040100Setup Start ***NS1***

Revision ID: URF 15-561

Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Stop ***NS2***

Start Date: 9/30/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/14/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240		0.00							
240	Packaging					1			
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D350-748-103								
	Location: _____								
	PPP Rev: _____								
250	QC21- Final Inspection - Work Order Release	0.00							
250									
QC	Memo	0.00							
Quality Control									

MLJ 15-11-27

MLJ 15-11-27

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS <table style="width: 100%; border: none;"> <tr> <td style="border: none;">Skid-tube ☐</td> <td style="border: none;">Cross tube ☐</td> <td style="border: none;">Water Jet ☐</td> <td style="border: none;">Engineering ☐</td> </tr> <tr> <td style="border: none;">Machining ☐</td> <td style="border: none;">Small Fab ☐</td> <td style="border: none;">Prod. Eng. Coord. ☐</td> <td style="border: none;">Quality ☐</td> </tr> <tr> <td style="border: none;">Thermoforming ☐</td> <td style="border: none;">Finishing ☐</td> <td style="border: none;">Rec/Store/Packaging ☐</td> <td style="border: none;">Other ☐</td> </tr> <tr> <td style="border: none;">Large Fab ☐</td> <td style="border: none;">Composite ☐</td> <td style="border: none;">Supplier ☐</td> <td></td> </tr> </table>						Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐																						
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Date :		Step #:		QTY Effective :			MRB (QSI042) Approval																		
Description Work Order Deviation				Disposition																					
								Completed By																	
								Lead hand / Supervisor Approval Verification																	
								QC / QA Coordinator Approval																	
Root Cause		FAULT CATEGORY																							
Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐	OTHER : ☐																			

Picklist Print

September 30, 2015 3:23:23 PM

Page 1

Work Order ID: 137436

137436

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP REV:A 15.03.23 NEW ISSUE DD VERF:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D350-748-143TRN

Manufactured

No

Each

9.0000

1

D350-748-143TRN

SS Crosstube Turning Detail

1

BL 15/11/12

Location

Loc Qty

Loc Code

LG003

9

129473

1

135154

1

135156

1

135157

1

135158

1

135159

1

135160

1

135161

1

135162

1

D3502-1

Manufactured

No

Each

28.0000

2

D3502-1

Support

DAS
41
9-89

15-11-26

Location

Loc Qty

Loc Code

LG052

28

130349

28

Each

54.0000

2

D5123-7

Manufactured

No

D5123-7

Clamp Cushion

DAS
41
9-89

15-11-26

Location

Loc Qty

Loc Code

LG052

54

131194

16

133492

12

136671

26

Picklist Print

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Page 2

Work Order ID: 137436

137436

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

AETC-1032

Purchased

No

Each

20.0000

1

DAS
41
9-89

15-11-26

AETC-1032

Insert

**

Location

Loc Qty

Loc Code

ST547

20

m133002

20

1

DAS
41
9-89

15-11-26

NAS1149C0363R

Purchased

No

Each

1,140.000

1

NAS1149C0363R

Washer

**

Location

Loc Qty

Loc Code

FP001

60

114742

60

GA

506

m133077

506

ST260a

494

m133077

494

ST271

80

m130673

20

m132763

60

2

DAS
41
9-89

15-11-26

MS21920-20

Purchased

No

Each

126.0000

2

MS21920-20

Clamp

**

Location

Loc Qty

Loc Code

FG

2

122254

2

LG

50

m133134

50

LG050

7

m128650

7

LG056

67

m132675

67

2

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Shop Packet Print

Page 2

Picklist Print

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Page 3

Work Order ID: 137436

137436

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

MS51958-63

Purchased

No

Each

42.0000

1

MS51958-63

Screw

**

DAS
41
9-89

15-11-26

Location

Loc Qty

Loc Code

ST273

42

m131886

42

AN4-6A

Purchased

No

220

Each

242.0000

16

16

AN4-6A

BOLT

**

133316

DAS
28
9-89

Location

Loc Qty

Loc Code

CA

143

M128403

43

M130851

100

ST345

99

M128403

8

M131153

91

DAS
28
9-89

D3500-1

Manufactured

No

220

Each

11.0000

4

4

D3500-1

Saddle

**

138663

DAS
28
9-89

Location

Loc Qty

Loc Code

ST406

11

129373

10

131168

1

DAS
28
9-89

NOV 26 2015 DAS
6
9-89

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Shop Packet Print

Page 3

Picklist Print

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Work Order ID: 137436

137436

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

AN5-32A

Purchased

No

220

Each

89.0000

4

4

AN5-32A

Bolt

DAS
28
9-89

DAS
28
9-89

Location

Loc Qty

Loc Code

ST299A

30

m132857

30

ST336

52

m132536

52

ST337

7

m131139

7

DAS
6
9-89

NAS1149D0463J

Purchased

No

220

Each

2,505.000

32

32

NAS1149D0463.J

WASHER

133284

DAS
6
9-89

DAS
28
9-89

Location

Loc Qty

Loc Code

GA

41

M129390

41

ST269

2464

M129682

86

M130799

371

M132317

125

M132677

888

M133077

994

DAS
28
9-89

NOV 26 2015

Picklist Print

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Work Order ID: 137436

137436

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

D3501-1 Manufactured No 220 Each 327.0000 16 16

D3501-1

Bushing

DAS
28
9-89

Location	Loc Qty	Loc Code
ST039	176	
130742	14	
135919	162	
ST046	1	
125925	1	
ST051A	150	
135918	150	

DAS
28
9-89

AN4-41A Purchased No 220 Each 187.0000 8 8

AN4-41A

Bolt

DAS
28
9-89

Location	Loc Qty	Loc Code
ST312A	138	
m130726	8	
m132189	130	
ST342	49	
m130716	49	

DAS
28
9-89

MS21042L5 Purchased No 220 Each 391.0000 4 4

MS21042L5

Nut

DAS
28
9-89

Location	Loc Qty	Loc Code
GA	146	
m127813	146	
ST260a	197	
m132677	197	
ST305	48	
m127813	19	
m131340	21	
m132123	8	

NOV 26 2015

DAS
28
9-89

Picklist Print

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Work Order ID: 137436

137436

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

MS21042L4

Purchased

No

220

Each

1,426.000

24

24

MS21042L 4

Locknut

M133363

DAS
28
9-89

Location

Loc Qty

Loc Code

FP001

2

m124231

2

GA

112

m127813

112

ST260a

170

m130799

56

m131803

6

m132262

108

ST305

1142

m128300

8

m130388

7

m130922

97

m131618

12

m132123

56

m132382

962

NOV 26 2015

DAS
6
8-89

DAS
28
9-89

Picklist Print

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Work Order ID: 137436

137436

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

NAS1149D0563J

Purchased

No

220

Each

964.0000

8

8

NAS1149D0563.J

Washer

DAS
26
9-89

NOV 26 2015

DAS
28
9-89

Location

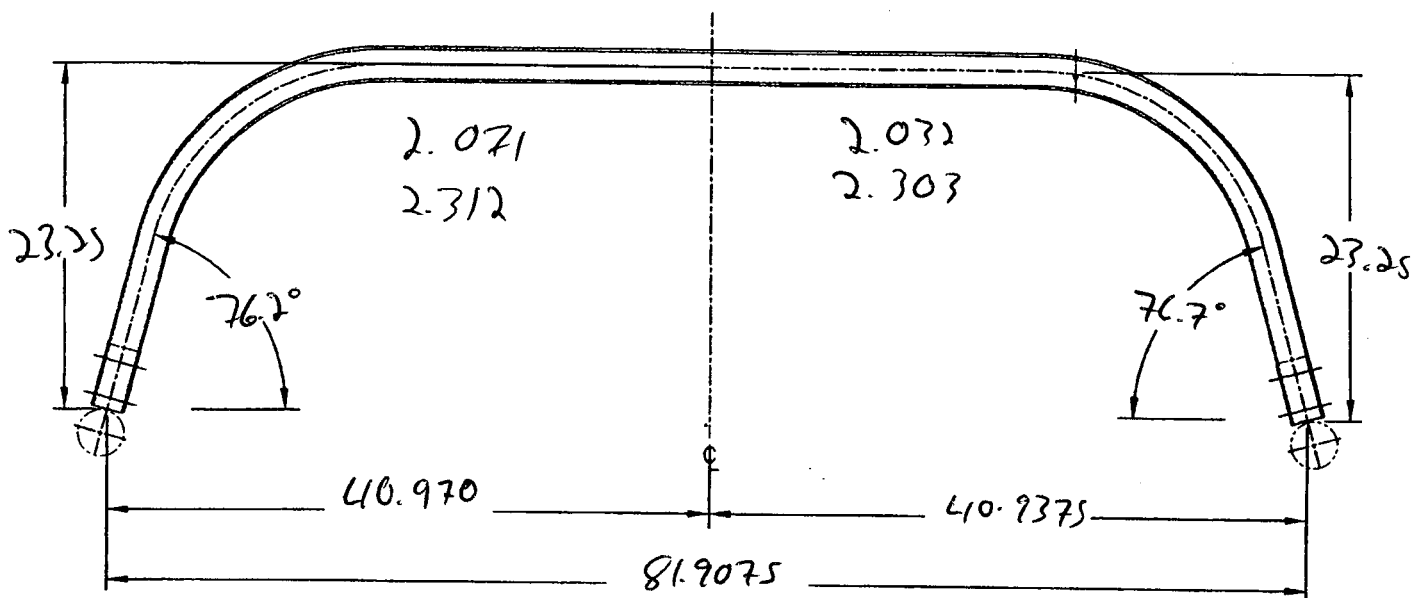
Loc Qty

Loc Code

GA	53	
m125807	53	
ST260a	428	
m130799	63	
m132035	55	
m132256	10	
m133134	300	
ST269	464	
m128257	156	
m132677	308	
ST271	19	
m131026	19	

DART AEROSPACE LTD		Work Order:	137436
Description: Crosstube High Fwd, SS (AS350/355)		Part Number:	D350-748-103
Inspection Dwg: D350-748-143 Rev: A		Page 1 of 1	

Required Dimension	Min	Max
Height	23.00	23.50
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.55	82.05
Bending Passes	7	--
Crushing	--	8%
Twist	--	0.38



	Side A	Side B
Bending Passes	27	31
Crushing	5.4%	6.2%
Comments		

QC15 Inspection	15/11/16	DAS
Date		49
		9-89

Rev	Date	Change	Revised by	Approved
A	15.09.09	New Issue	KJ	AA

Item	Qty -143	Part Number	Description
	X	D350-748-143	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
1	1	D8021-125	CROSSTUBE
2	2	D3502-1	SUPPORT
3	2	D5123-7	CLAMP CUSHION
4	1	AETC-1032	INSERT
5	2	MS21920-20 OR MS21920-21/-22	CLAMP (PER DART SPEC. M-MS21920-20/-21/-22)
6	1	NAS1149C0363R	WASHER (OR AN960C10)
7	1	NAS1635-3-8	SCREW (OR MS51958-63)
8	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D8021-125 (17-4PH)
FINISHED LENGTH AFTER TURNING = 112.270±0.06 (AFTER BENDING/TRIMMING = 110.27 REF)
- 2) FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCE: PER DART QSI 018 UNLESS OTHERWISE NOTED.
WALL THICKNESS ECCENTRICITY PER DART QSI 038 7.2
MIN. ALLOWABLE WALL IS -0.020 FROM NOMINAL
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-143" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.280 HOLE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.

TURNING

- 10) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES PER SIDE. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D. ON TOP HALF OF BEND, AND 8% ON BOTTOM HALF OF BEND.
- 12) MAX AMPLITUDE OF RIPPLING ALONG BENT PORTION OF THE TUBE IS 0.030 (ZN A1-3)
- 13) MAX TWIST: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.38 (ZN C1-3).

ASSEMBLY

- 14) TO INSTALL D3502-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT), APPLY A 0.02" TO 0.05" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

UNDER REVIEW

15/4/24

REF 15-561

137 436

A	NEW ISSUE	CP	15.01.21
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	15.01.21		

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. D350-748-143
TITLE CROSSTUBE (AS 350/355 HI FWD)

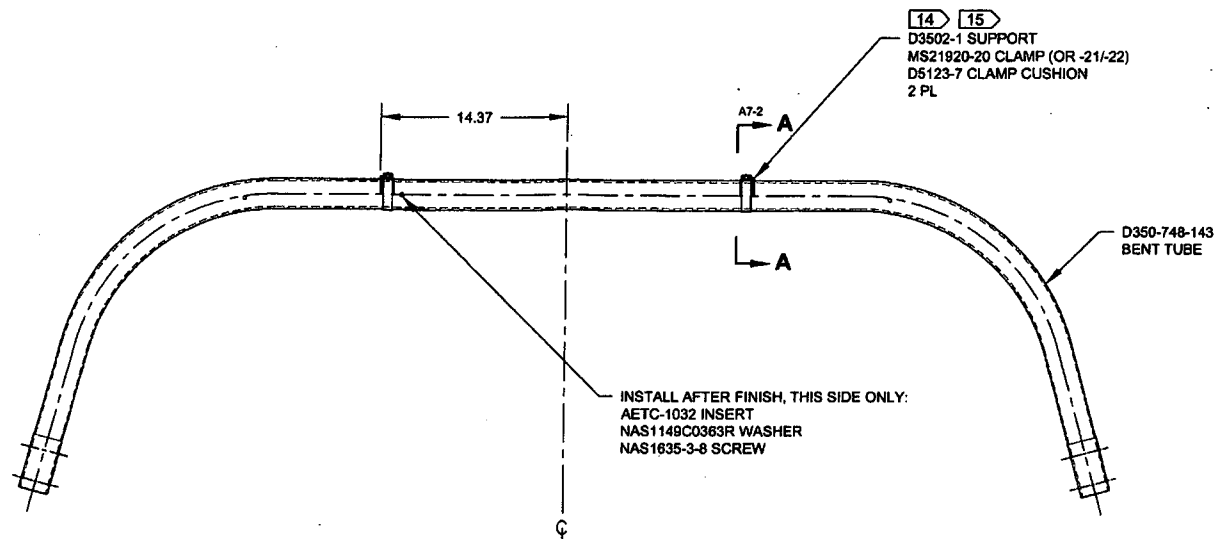
REV. A
SHEET 1 OF 4
SCALE NTS

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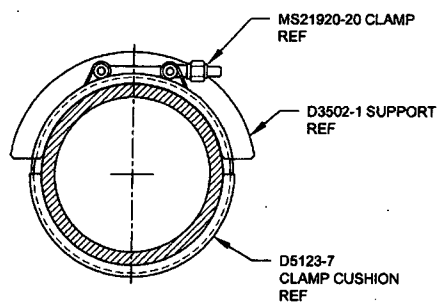
RELEASED

2015 MAR. 18

REF 15-547



**D350-748-143
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 6X

UNDER REVIEW

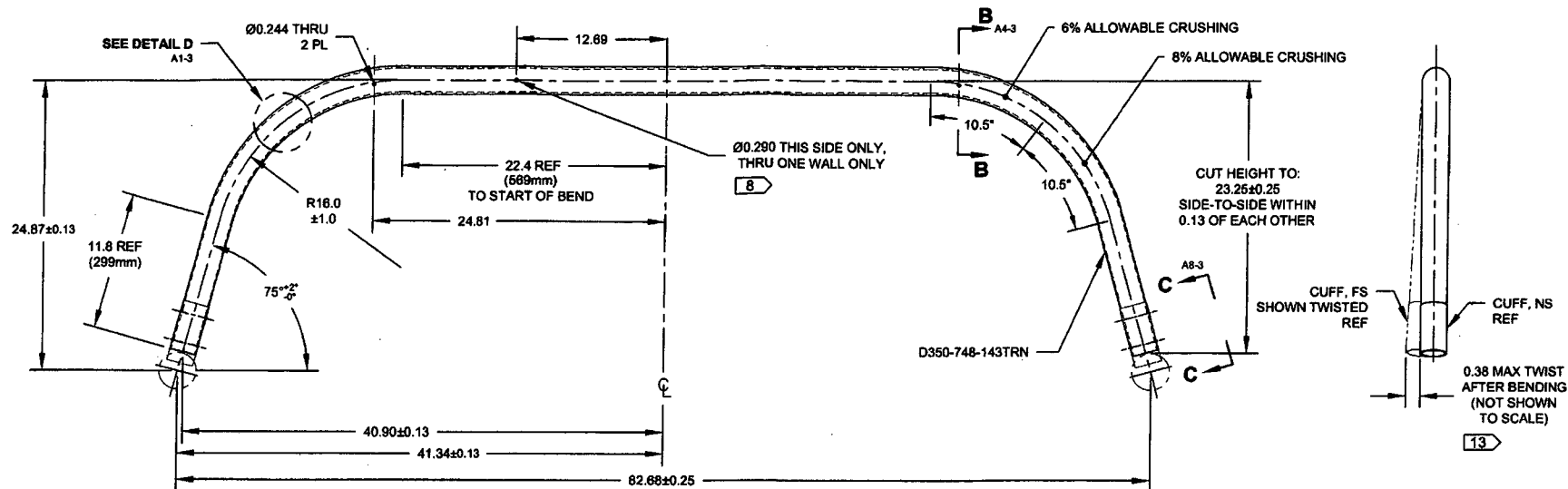
4/15/25

RELEASED

2015 MAR '18

4/ ECU-15-547

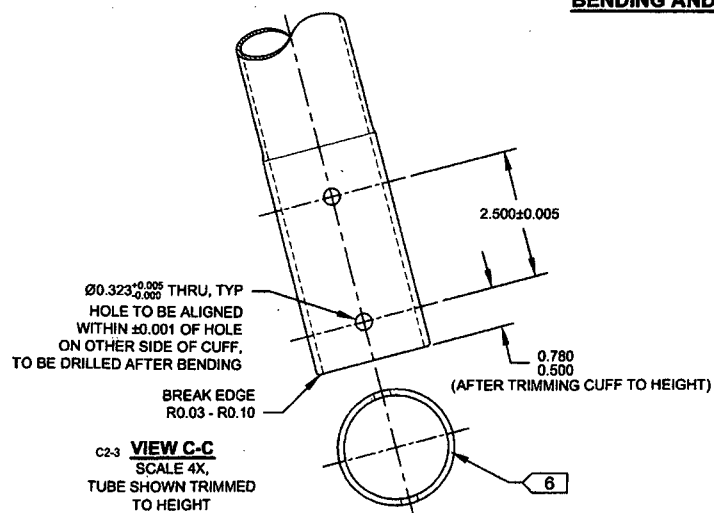
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DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		D350-748-143	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI FWD)	NTS
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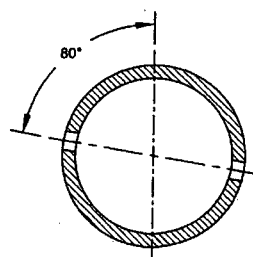
D350-748-143
BENDING AND DRILLING DETAIL 11

RELEASED

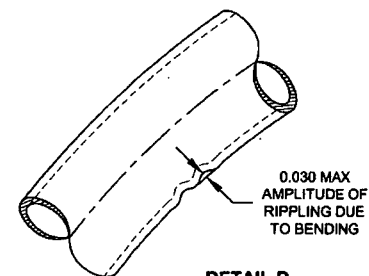
2015 MAR 18



VIEW C-C
SCALE 4X,
TUBE SHOWN TRIMMED
TO HEIGHT



SECTION B-B D3-3
SCALE 6X

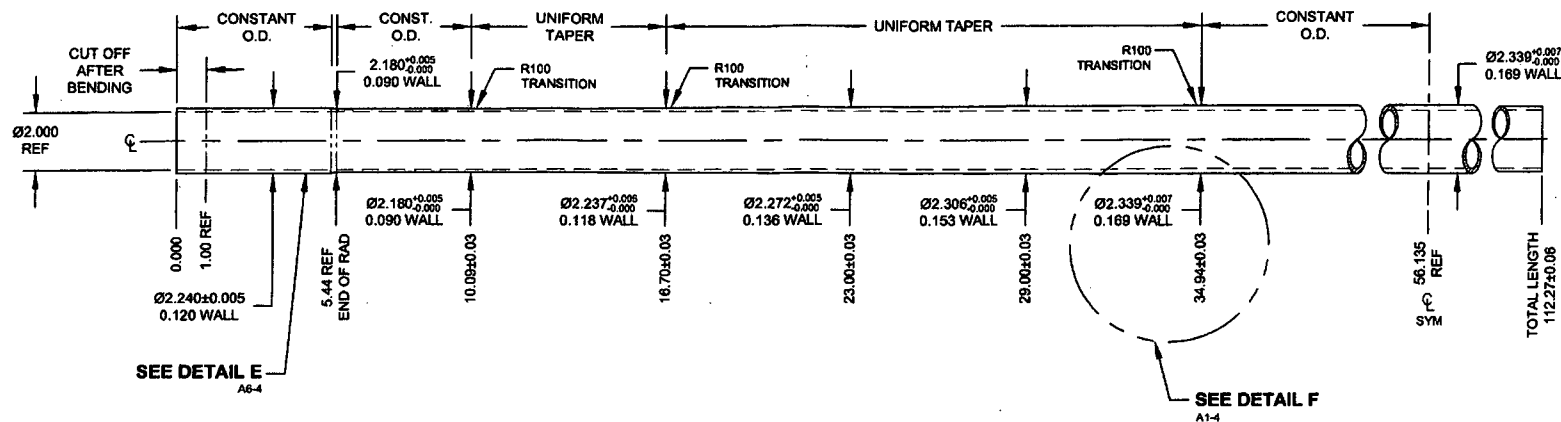


DETAIL D D7-3
SCALE 4X
RIPPLING EXAGGERATED

UNDER REVIEW

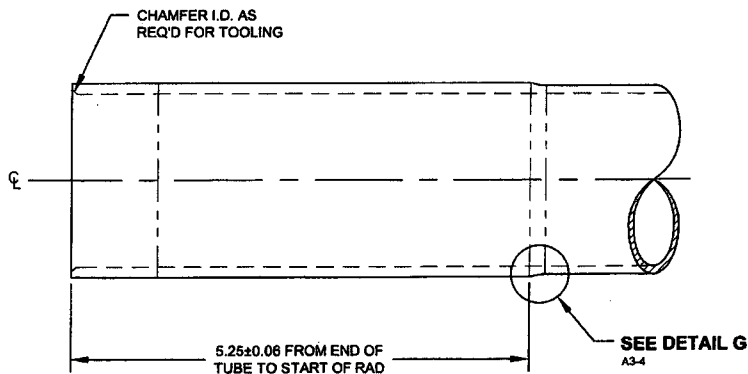
15/14/28

DESIGN	DP	DART AEROSPACE LTD	
DRAWN	DP	HAWKESBURY, ONTARIO, CANADA	
CHECKED	AP	DRAWING NO.	REV. A
MFG. APPR.	AP	D350-748-143	SHEET 3 OF 4
APPROVED	AP	TITLE	SCALE
DE APPR.	AP	CROSSTUBE (AS 350/355 HI FWD)	NTS
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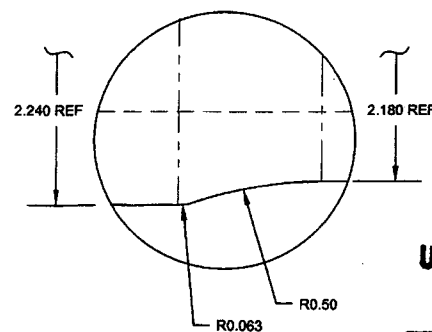


**D350-748-143TRN
TURNING DETAIL**

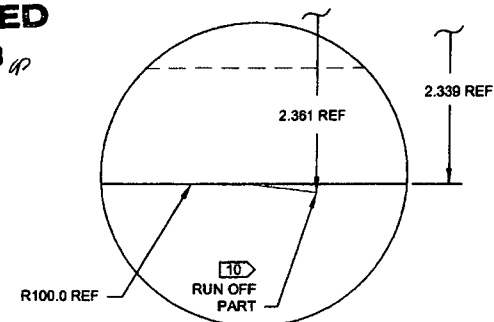
RELEASED
2015 MAR 18



**DETAIL E:
CROSSTUBE CUFF** C7-4
SCALE 3X



**DETAIL G:
CUFF TRANSITION** A5-4
NOT TO SCALE



**DETAIL F:
TOOL RUN-OFF** C3-4
NOT TO SCALE

UNDER REVIEW
15/4/21

DESIGN	JP	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	JP		
CHECKED	A.P.	DRAWING NO.	REV. A
MFG. APPR.	[Signature]	D350-748-143	SHEET 4 OF 4
APPROVED	[Signature]	TITLE	SCALE
DE APPR.	[Signature]	CROSSTUBE (AS 350/355 HI FWD)	NTS
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Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID PO30533

Purchase Order Date 11/20/2015

PO Print Date 11/23/2015

Page Number 2 of 6

Order From :
SKYSERVICE
6120 MIDFIELD ROAD
MISSISSAUGA, ONTARIO L5P 1B1
CANADA

VC-SKY001

Ship To : DART AEROSPACE LTD
1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name
Vendor Phone 905-678-5636

Ship To Contact
Ship To Phone
Ship Via: Delivered
Ship Acct:

Buyer Chantal Lavoie
Customer POID
Customer Tax # 10127-2607
Terms Net 30
Currency CAD
FOB FCA - (Free Carrier)

Line Total: \$115.00

3	138508	D212-664-207 CROSSTUBE	11/23/2015	1.00	\$115.00	\$115.00
---	--------	---------------------------	------------	------	----------	----------

Yes
11/23/2015

SAME AS ABOVE

Line Total: \$115.00

4	137436	D350-748-103 CROSSTUBE	11/23/2015	1.00	\$115.00	\$115.00
---	--------	---------------------------	------------	------	----------	----------

Yes
11/23/2015

SAME AS ABOVE

Line Total: \$115.00

5	137437	D350-748-103 CROSSTUBE	11/23/2015	1.00	\$115.00	\$115.00
---	--------	---------------------------	------------	------	----------	----------

Yes
11/23/2015

SAME AS ABOVE

Note:

11/23/2015



skyservice Work Order Traveler

Sky Service F.B.O. Inc.

DOT APP 53-89 / EASA 145.7142 / BDA AMO 385

WO #: MWO26474	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: 30533
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN:	CSN:	TSO:	
Task: UNSCHEDULED			Sequence: 1

Work Required:

CARRY OUT NDT ON 13 CROSSTUBES AS PER PO30533

2 AFT CROSSTUBES, ITEM ID# D212-664-207 , WORK ORDERS ID# 136710, 138508

6 STAINLESS STEEL AFT CROSSTUBES, ITEM ID# D350-748-203 , WORK ORDERS ID# 138647, 138648, 138649, 138650, 138661, 138662

5 STAINLESS STEEL FWD CROSSTUBES, ITEM ID# D350-748-103 , WORK ORDERS ID# 137437, 137438, 138714, 137436, 137439

SP15-11-23

Action Taken:						Date:	Initial/Stamp:
LPI C/O IAW ASTM E-1417M13 NO CRACK FOUND PEN. ZL-56, MPO13600, UV M-20141, CLEANER SKC-S MPO13923 , DEV. MPO11715						NOV 20 2015	
Description	Location	P/N	Qty	Batch	S/N Off	S/N On	

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature:	ACA/SCA Stamp 	Date: NOV 20 2015
Name: RAFIK MELIKIAN		

QA Closed:

Date:

WORK ORDER NON-CONFORMANCE / UPDATE

Work Order: 137436

Part No. D 350-748-103

NCR No.

DISPOSITION

Rework ☒Scrap ☐Use-as-is ☐Suspected Unapproved ☐Work Order update only ☐

AGAINST DEPARTMENT/PROCESS

Skid-tube ☐Machining ☐Thermoforming ☐Large Fab ☐Cross tube ☐Small Fab ☐Finishing ☐Composite ☐Water Jet ☐Prod. Eng. Coord. ☐Rec/Store/Packaging ☐Supplier ☐Engineering ☐Quality ☐Other ☐

Date:

15.11.26

Step #:

QTY Effective:

Description Work Order Deviation

AETC-1032 INSERTS BREAKING ON INSTALLATION

Disposition

BASED ON ENG TESTING IT WAS FOUND THAT INSTALLATION IS MORE RELIABLE IF INSTALLATION PRESSURE (AIR HOSE) IS REGULATED TO 50 PSI AND INSTALLATION HOLE IS REAMED TO Ø 0.290 IN ACCORDANCE MANUFACTURERS INSTRUCTIONS. OPEN PAR TO ADD NOTE TO STEP # 200 WHICH READS "LIMIT AIR PRESSURE TO 50PSI WHEN INSTALLING AETC-1032 INSERT AND ONLY EXPAND INSERT ONCE"

MRB (QSI042) Approval

A.L.

15.11.26

Completed By

Lead hand / Supervisor
Approval VerificationQC / QA Coordinator
Approval

Root Cause

Environment ☐Design ☐Doc/Data ☐Equip/Tooling ☐Handling/Pre ☐Material ☐Internal Transport ☐Tribal Knowledge ☐LOA ☐Substation ☐Past Expiry Date ☐Misidentified ☐No Re-verification ☐Operator ☐Offset/Setup ☐Supplier ☐Training ☐Use for Testing ☐Poor Information ☐Rushing ☐Product Improvement ☐Process Improvement ☐Manufacturing Process ☐Past Due ☐Pressure/Forced ☐Bending ☐Centre Not Concentric ☐Cracks ☐Crimp/Kink/Ripple/Wave ☐Cuffs ☐Crushing ☐Heat Treat ☐Wave/Twist in Tube ☐Marks/Chatter ☐OTHER: ☐

FAULT CATEGORY

Temperature/Cure ☐Set-up ☐BOM/Route ☐Broken/Damage/Defect ☐Inspection Incomplete/Unqualified ☐Contamination ☐Countersink ☐Cut Too Short ☐Instructions Incomplete/Unclear ☐Drill Holes ☐Power Loss/Surge ☐Folio/Program ☐Grain ☐Weld ☐Wrong Stock Pulled ☐Out of Sequence ☐Off-set ☐Mislabeled ☐Fit/Function ☐Misaligned/off center ☐Positioned Wrong ☐Outside Dimensions ☐Over/Under tolerance ☐Part Incorrect ☐Part Lost/Missing ☐Part Moved ☐Drawing ☐Finish ☐Misread ☐Turning Sequence ☐

DART AEROSPACE LTD.

IIN-D350-748

Page 6 of 12

4.0 WEIGHT AND BALANCE

The following weight and balance information is for Dart crosstube installations only. This data should be similar to the existing installation. Differences from the parts removed are the responsibility of the installer.

DART CROSSTUBE	FWD/ AFT	WEIGHT	STA	MOMENT
D350-748-101	Fwd	35.2 lb	106.3 in	3742 lb-in
D350-748-103		(16.0 kg)	(2.70 m)	(43.2 kg-m)
D350-748-201	Aft	34.7 lb	162.4 in	5635 lb-in
D350-748-203		(15.7 kg)	(4.12 m)	(64.7 kg-m)

5.0 PARTS LIST

Qty -101	Qty -103	Qty -201	Qty -203	Part Number	Description
X				D350-748-101	CROSSTUBE INSTALLATION, AS 350/355 HIGH FWD
	X			D350-748-103	CROSSTUBE INSTALLATION, AS 350/355 HIGH FWD (SS)
		X		D350-748-201	CROSSTUBE INSTALLATION, AS 350/355 HIGH AFT
			X	D350-748-203	CROSSTUBE INSTALLATION, AS 350/355 HIGH AFT (SS)
1				D350-748-141	CROSSTUBE ASSEMBLY, AS 350/355 HIGH FWD
	1			D350-748-143	CROSSTUBE ASSEMBLY, AS 350/355 HIGH FWD (SS)
		1		D350-748-241	CROSSTUBE ASSEMBLY, AS 350/355 HIGH AFT
			1	D350-748-243	CROSSTUBE ASSEMBLY, AS 350/355 HIGH AFT (SS)
*2	*2	*2	*2	D3502-1	SUPPORT
*2	*2	*2	*2	D5123-7	CLAMP CUSHION
*1		*1		AELS-1032-225	INSERT
	*1		*1	AETC-1032	INSERT
*2	*2	*2	*2	MS21920-20	CLAMP (OR MS21920-21/-22)
*1		*1		MS27039-1-10	SCREW
	*1		*1	NAS1685-3-8	SCREW (OR MS51958-63)
*1		*1		NAS1149D0363J	WASHER (OR AN960JD10)
	*1		*1	NAS1149C0363R	WASHER (OR AN960C10)
4	4	4	4	D3500-1	SADDLE
16	16	16	16	D3501-1	BUSHING
16	16	16	16	AN4-6A	BOLT
8	8	8	8	AN4-41A	BOLT
4	4	4	4	AN5-32A	BOLT
32	32	32	32	NAS1149D0463J	WASHER (OR AN960JD416)
8	8	8	8	NAS1149D0563J	WASHER (OR AN960JD516)
24	24	24	24	MS21042L4	NUT (OR MS21042-4)
4	4	4	4	MS21042L5	NUT (OR MS21042-5)

* REFERENCE ONLY. PARTS ARE INCLUDED IN D350-748-141/-143/-241/-243 ASSEMBLIES ABOVE

DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☒ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☒ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐									
Date : <u>16-01-19</u>	Step #: <u>200</u>	QTY Effective : <u>①</u>		MRB (QSI042) Approval DAS 9 9-89 <u>16-01-18</u>							
Description Work Order Deviation <u>AETC-1032 inserts breaking on installation</u> <u>P.C. equipment, no air regulation on tool</u>		Disposition <u>had on work order to limit</u> <u>air pressure to 50 psi when</u> <u>installing AETC-1032 insert</u>		Completed By DAS 10 9-89 <u>16.01.19</u> Lead hand / Supervisor Approval Verification DAS 9 9-89 <u>16.01.19</u> QC / QA Coordinator Approval DAS 9 9-89 <u>16.01.19</u>							
Root Cause <table style="width:100%; border: none;"> <tr> <td style="width:50%; border: none;"> Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☒ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ </td> <td style="width:50%; border: none;"> No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐ </td> </tr> </table>			Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☒ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	FAULT CATEGORY <table style="width:100%; border: none;"> <tr> <td style="width:33%; border: none;"> Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ </td> <td style="width:33%; border: none;"> Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ ☒ Broken/Damage/Defect Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ </td> <td style="width:33%; border: none;"> Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☐ Misaligned/off center ☐ </td> <td style="width:33%; border: none;"> Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐ </td> </tr> </table>			Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ ☒ Broken/Damage/Defect Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐
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OTHER : _____											